NOVEMBER 2000

Final Environmental Assessment

RENOURISHMENT AT MIAMI BEACH IN THE VICINITY OF 63RD STREET

BEACH EROSION CONTROL AND HURRICANE PROTECTION PROJECT DADE COUNTY, FLORIDA

U.S. Army Corps
of Engineers
Jacksonville District

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P. O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019

REPLY TO
ATTENTION OF

FINDING OF NO SIGNIFICANT IMPACT

RENOURISHMENT AT MIAMI BEACH IN THE VICINITY OF 63RD STREET

BEACH EROSION CONTROL AND HURRICANE PROTECTION PROJECT DADE COUNTY, FLORIDA

I have reviewed the Environmental Assessment (EA) for the proposed action. This Finding incorporates by reference all discussions and conclusions contained in the Environmental Assessment enclosed hereto. Based on information analyzed in the EA, reflecting pertinent information obtained from agencies having jurisdiction by law and/or special expertise, I conclude that the proposed action will not significantly impact the quality of the human environment and does not require an Environmental Impact Statement. Reasons for this conclusion are in summary:

a. The proposed action would restore a section of severely eroded beach at Miami Beach, Florida thus preventing or reducing loss of public beachfront to continuing erosional forces and preventing or reducing periodic damages and potential risk to life, health and property in the developed lands adjacent to the beach.

b. The Draft Fish and Wildlife Coordination Act Report of October 4, 2000, indicates no objection by the Department of the Interior and full compliance with the Endangered Species Act, the Coastal Barrier Resources Act, and the Fish and Wildlife Coordination Act.

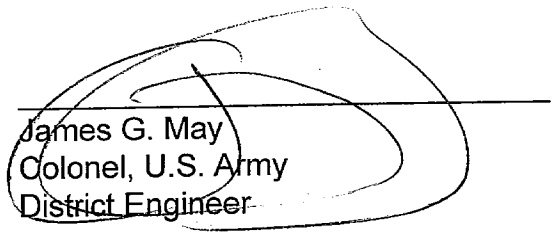
c. Measures to prevent or minimize impacts to sea turtles in accordance with Biological Opinions from the U.S. Fish and Wildlife Service and the National Marine Fisheries Service will be implemented during and after project construction. To protect the manatee, all water-based activities would follow standard manatee protection measures. There would be no adverse impacts to other Federally listed endangered or threatened species.

d. Pending the State's concurrence with the Federal Coastal Zone Consistency Determination (Appendix B of the EA), the action is consistent with the State's Coastal Zone Management program.

e. Based on historic property field investigations and consultation with the State Historic Preservation Officer, the offshore borrow areas were designed to avoid potentially significant cultural resources. No significant historical properties have been identified on the segment of beach proposed for renourishment.

f. Water Quality Certification, pursuant to Section 401 of the Clean Water Act, was issued by the Florida Department of Environmental Protection on November 20, 2000.

g. Measures to eliminate, reduce, or avoid potential impacts to fish and wildlife resources include the following: (1) A buffer zone with a minimum distance from any hardbottom has been established for the proposed borrow areas, (2) Visual inspections of hardbottom in proximity to the dredging area would be routinely conducted to look for any indicators of turbidity, sedimentation or mechanical impacts, (3) Extensive turbidity monitoring would be performed at the beach fill and dredging sites during construction to ensure turbidity levels do not exceed the State water quality standard, (4) To avoid mechanical damage to hardbottom habitat associated with dredging, precision electronic positioning equipment would be used to ensure the dredge remains in the borrow areas during dredging operations. (5) Where the discharge pipeline crosses the nearshore hardbottom, collars would be placed along the pipe at 100' intervals to suspend it off the bottom to the greatest extent possible, (6) Any unavoidable impacts to the nearshore hardbottom from the pipeline would be appropriately mitigated as described in the Environmental Assessment.



James G. May
Colonel, U.S. Army
District Engineer

27 NOV 00
Date

FINAL
ENVIRONMENTAL ASSESSMENT

RENOURISHMENT AT MIAMI BEACH
IN THE VICINITY OF 63RD STREET

DADE COUNTY BEACH EROSION CONTROL
AND HURRICANE PROTECTION PROJECT
DADE COUNTY, FLORIDA

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

FINAL
ENVIRONMENTAL ASSESSMENT

RENOURISHMENT AT MIAMI BEACH IN THE VICINITY OF 63RD STREET

DADE COUNTY BEACH EROSION CONTROL AND HURRICANE PROTECTION PROJECT DADE COUNTY, FLORIDA

1 PROJECT PURPOSE AND NEED

1.1 PROJECT AUTHORITY.

1.1.1 INITIAL AUTHORIZATION.
The Beach Erosion Control and Hurricane Protection (BEC & HP) Project for Dade County, Florida was authorized by the Flood Control Act of 1968 (see figure 1, site map). In addition, Section 69 of the 1974 Water Resources Act (P.L. 93-251 dated 7 march 1974) included the initial construction by non-federal interests of the 0.85-mile segment along Bal Harbour Village, immediately south of Bakers Haulover Inlet. The authorized project, as described in HD 335/90/2, provided for the construction of a protective/recreational beach and a protective dune for 9.3 miles of shoreline between Government Cut and Baker's Haulover Inlet (encompassing Miami Beach, Surfside and Bal Harbour) and for the construction of a protective/recreational beach along the 1.2 miles of shoreline at Haulover Beach Park.

1.1.2 SUPPLEMENTAL APPROPRIATION.
The Supplemental Appropriations Act of 1985 and the Water Resources Development Act of 1986 (Public Law 99-662) provided authority for extending the northern limit of the authorized project to include the construction of a protective beach along the 2.5 mile reach of shoreline north of Haulover Beach Park (Sunny Isles) and for periodic nourishment of the new beach. This authority also provided for the extension of the period of Federal participation in the cost of nourishing the authorized 1968 BEC & HP Project for Dade County, which covered 10.5 miles of shoreline extending from Government Cut north to the northern boundary of Haulover Beach Park, from 10 years to the 50-year life of the project.

1.2 PROJECT LOCATION.
The project is located on the southeast Florida coast within Dade County. The section of beach to be renourished is located in northern Miami Beach in the vicinity of 63rd Street (figure 1, location map).

1.3 PROJECT NEED OR OPPORTUNITY.
Nourishment of Dade County Beaches has become a necessity to provide storm protection. The purpose of the project is to reduce loss of public beachfront to continuing erosional forces and to prevent or reduce periodic damages and potential risk to life, health, and property in the developed lands adjacent to the beach. Continual erosion of the beach has resulted in the loss of nesting habitat for threatened and endangered sea turtles, loss of protection from storm and hurricane damage and potential risk to life, health and property. Recent storm impacts to the project (Hurricane Andrew in 1992, Hurricane Gordon in 1994, and the winter storms in 1996) have severely increased the need for the project.

1.4 DESCRIPTION OF PROPOSED ACTION
The placement of about 200,000 cubic yards of material will be required along the beach in the vicinity of 63rd, Miami Beach Florida. The beach fill would cover approximately 2,800 feet of shoreline from DEP monument R-44 to R-46A. The beach would have a berm width of 205 feet from ECL at an elevation of +9 feet mean low water (MLW), with a construction tolerance of +/- 0.5 feet. The front slope of the fill will be 1 vertical on 15 horizontal (figure 2, project plan view and figure 3, typical beach profile). This project has been previously nourished with the same design as proposed here. The proposed borrow areas are located south of Government Cut approximately 2.5 miles east of Key Biscayne, in water depths of 30 to 40 feet (figure 1).

1.5 RELATED ENVIRONMENTAL DOCUMENTS.
The following is a list of related documents:

a. Dade County Beaches, Florida, Beach Erosion Control and Hurricane Surge Protection, General Design Memorandum, Phase I. U.S. Army Corps of Engineers, Jacksonville District, 1974.

b. Final Environmental Impact Statement, Beach Erosion Control and Hurricane Surge Protection Project, Dade County, Florida. U.S. Army Corps of Engineers, Jacksonville District, April 1975.

c. Beach Erosion Control and Hurricane Protection Study for Dade County, Florida, North of Haulover Beach Park, Survey Report and EIS Supplement. U.S. Army Corps of Engineers, Jacksonville District, June 1984.

d. Final Environmental Assessment, Second Periodic Nourishment, Sunny Isles and Miami Beach Segments, Beach Erosion Control and Hurricane Protection Project, Dade County, Florida. U.S. Army Corps of Engineers, Jacksonville District, May 1995.

e. Coast of Florida Erosion and Storm Effects Study, Region III, Feasibility Report with Final Environmental Impact Statement. U.S. Army Corps of Engineers, Jacksonville District, October 1996.

f. Final Environmental Assessment, Beach Erosion Control and Hurricane Protection Project Dade County, Florida, Second Periodic Nourishment, Surfside and South Miami Beach Segments. U.S. Army Corps of Engineers, Jacksonville District, April 1997.

g. Final Environmental Impact Statement, Beach Erosion Control and Hurricane Protection Project Dade County, Florida, Modifications at Sunny Isles. U.S. Army Corps of Engineers, Jacksonville District, April 1998.

h. Dade County, Florida, Shore Protection Project, Design Memorandum, Addendum III, North of Haulover Park (Sunny Isles) Segment, U.S. Army Corps of Engineers, Jacksonville District, January 1995.

1.6 DECISIONS TO BE MADE.

The alternatives to provide shore protection for Dade County beaches, from Government Cut north to Bakers Haulover Inlet (including this segment of Miami Beach), were evaluated in references 1.5a and 1.5b above. The plan recommended and approved for implementation was beach restoration with periodic renourishment. This Environmental Assessment (EA) will not re-evaluate the alternatives to beach renourishment (other than "no-action") but will evaluate alternative sand sources to accomplish the renourishment of this section of Miami Beach. Alternatives to beach renourishment have been extensively evaluated in prior documents for Dade County on other similar projects.

1.7 SCOPING AND ISSUES.

Scoping for the proposed project was initiated by a Public Notice dated June 1, 2000. The Public Notice was distributed to the appropriate Federal, State and local agencies, appropriate city and county officials, and other parties known to be interested in the project. Copies of the Public Notice, the list of addresses used to distribute the notice, and letters of response are included in Appendix C, Pertinent Correspondence.

1.7.1 ISSUES EVALUATED IN DETAIL.

The following issues were identified during scoping and by the preparers of this Environmental Assessment to be relevant to the proposed action and appropriate for detailed evaluation:

a. Turbidity and sedimentation impacts to nearshore and offshore hardground/reef communities.
b. Monitoring of reefs adjacent to the borrow area for turbidity and sedimentation impacts.
c. Impacts to nearshore hardground communities from placement of the discharge pipeline.
d. Impacts on nesting sea turtles, nests, and hatchlings.
e. Mitigation.
f. Impacts on historic properties (i.e. historic shipwrecks).
g. Water quality.
h. Recreation.
i. Endangered Species

1.7.2 IMPACT MEASUREMENT.

The following provides the means and rationale for measurement and comparison of impacts of the proposed action and alternatives.

1.7.2.1 Hardground and Reef Impacts.

Based on extensive experience with beach renourishment and use of off-shore borrow in Dade County and other Florida beaches, impacts to hardground and reefs can be predicted based on proximity, currents, nature of borrow material, buffer zones and other factors. Our desire in selecting an alternative is to keep impacts to these resources to the minimum practicable in consideration of other project requirements.

1.7.2.2 Sea Turtles.

Sea Turtle nesting is closely monitored along Dade County's public beaches, including Miami Beach. Detected nests are relocated to a safe hatchery. Impacts of compaction and scarps are fairly well established. In addition, continued beach erosion would reduce available nesting habitat. Corrective and mitigative protocols have been established. It is our goal to minimize impacts to sea turtles and to comply with the requirements of the Endangered Species Act.

1.7.2.3 Other Impacts.

Bases for impact measurement and comparison are stated more specifically in section 4.0 on ENVIRONMENTAL EFFECTS and other sections of this document and its appendices.

1.7.3 ISSUES ELIMINATED FROM DETAIL ANALYSIS.

No issues were specifically identified for elimination.

1.8 PERMITS, LICENSES, AND ENTITLEMENTS.

The proposed beach renourishment is subject to the Coastal Zone Management Act. Consultation with the State Historic Preservation Officer is also required. Since there would be a discharge of dredged or fill material into waters of the United States, the proposed Action is subject to Section 404 of the Clean Water Act. In addition the proposed action is subject to Section 401 of the Act for certification of water quality by the state. The U.S. Army Corps of Engineers, Jacksonville District, has submitted an application for a Section 401 Water Quality Certificate (WQC) from Florida Department of Environmental Protection (FDEP).

If conducted during the sea turtle nesting and hatching season, the proposed action will require daily sea turtle nest surveys and nest relocations. A permit from the Florida Fish and Wildlife Conservation Commission (FWC) to handle sea turtles and relocate nests will be required for the person(s) performing the surveys and nest relocations associated with the proposed action. For the proposed renourishment at Miami Beach, personnel from the Dade County Department of Parks and Recreation will be conducting the surveys and nest relocations.

The project sponsor, Dade County Department of Environmental Resources Management, is responsible for obtaining any real estate easements and rights of way required for this project.

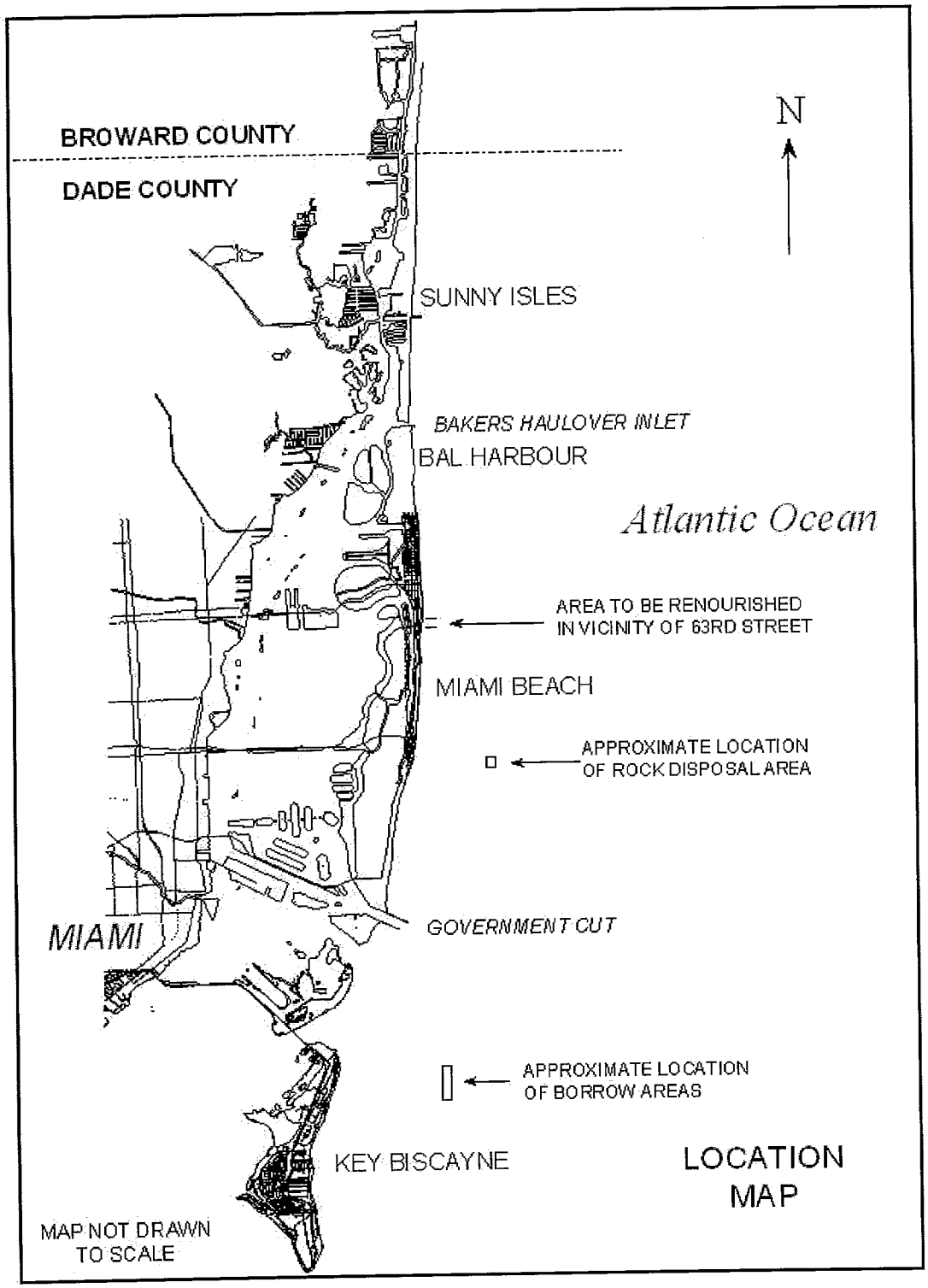
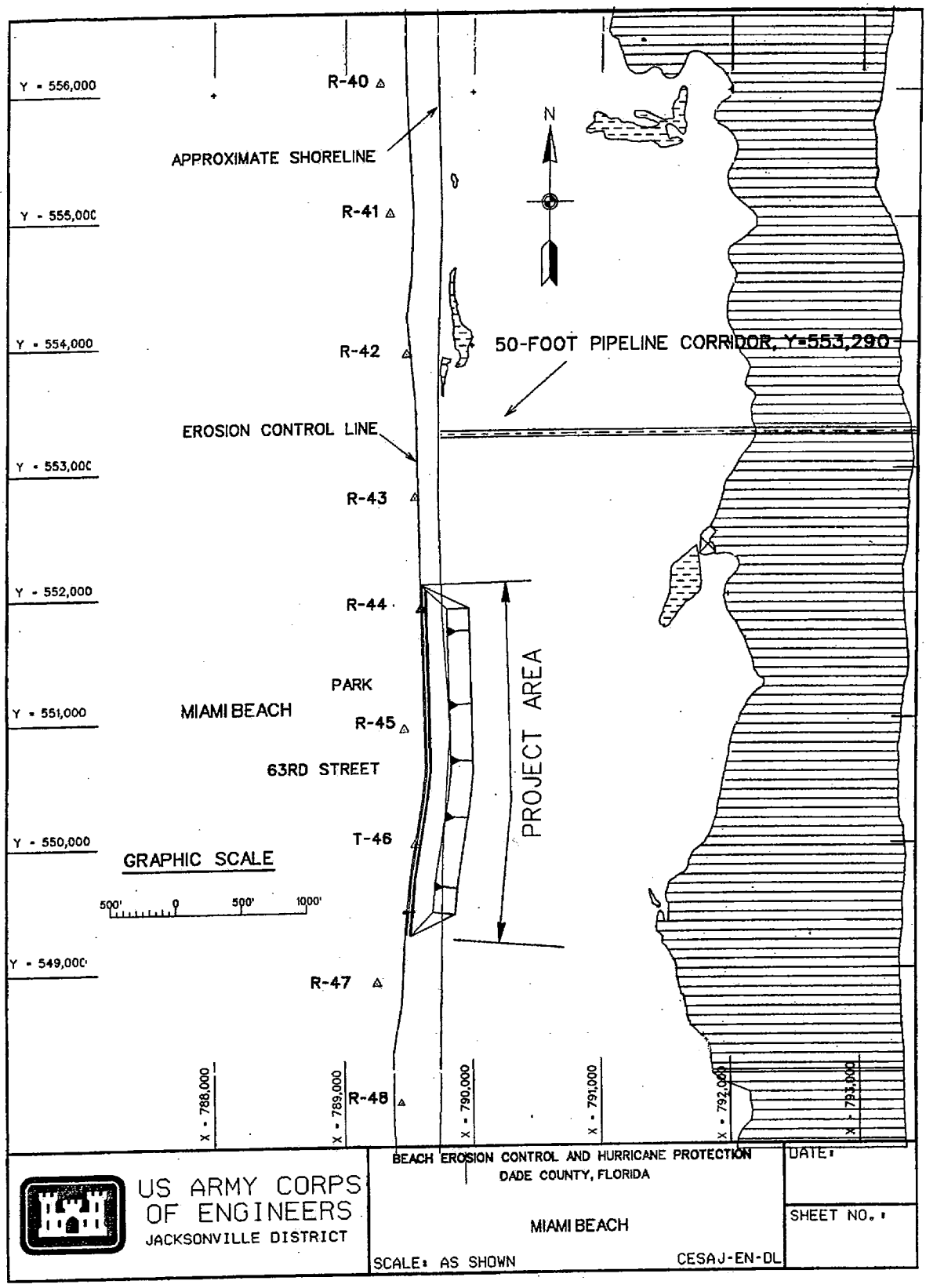
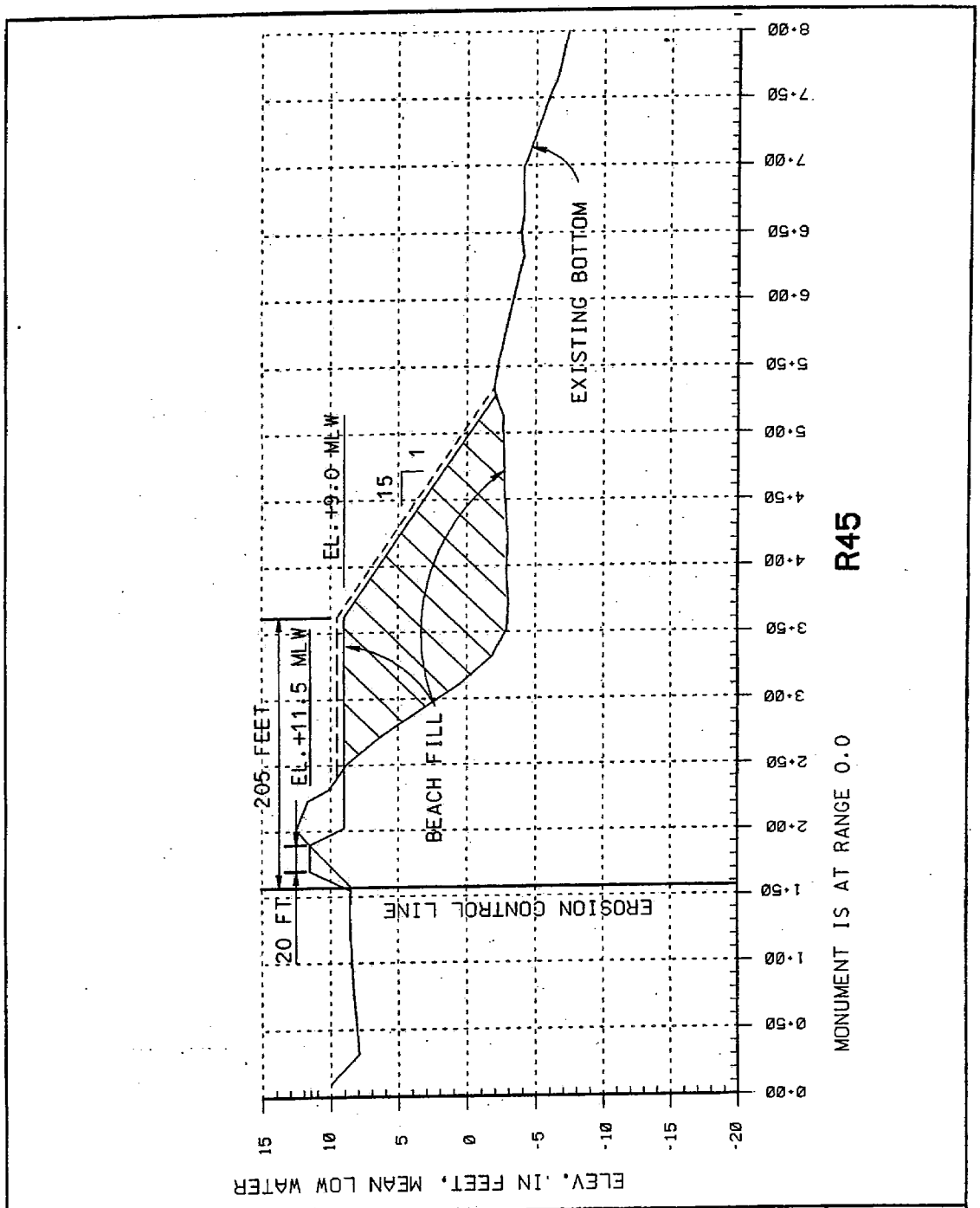

BROWARD COUNTY
DADE COUNTY
N
SUNNY ISLES
BAKERS HAULOVER INLET
BAL HARBOUR
Atlantic Ocean
AREA TO BE RENOURISHED
IN VICINITY OF 63RD STREET
MIAMI BEACH
APPROXIMATE LOCATION
OF ROCK DISPOSAL AREA
MIAMI
GOVERNMENT CUT
APPROXIMATE LOCATION
OF BORROW AREAS
KEY BISCAYNE
LOCATION
MAP
MAP NOT DRAWN
TO SCALE

FIGURE 1



PLAN VIEW OF BEACH FILL AREA **FIGURE 2**



US ARMY CORPS OF ENGINEERS
JACKSONVILLE DISTRICT

BEACH EROSION CONTROL AND HURRICANE PROTECTION
DADE COUNTY, FLORIDA

MIAMI BEACH

SCALE: AS SHOWN CESAJ-EN-DL

DATE:

SHEET NO.:

TYPICAL BEACH PROFILE **FIGURE 3**

2 ALTERNATIVES

The alternatives section is the heart of this EA. This section describes in detail the no-action alternative, the proposed action, and other reasonable alternatives that were studied in detail. Then based on the information and analysis presented in the sections on the Affected Environment and the Probable Impacts, this section presents the beneficial and adverse environmental effects of all alternatives in comparative form, providing a clear basis for choice among the options for the decision maker and the public.

As previously mentioned in Section 1.6, the alternatives to provide shore protection for Dade County beaches were evaluated in previous reports. The plan recommended and approved for implementation was beach restoration with periodic renourishment. This EA will not re-evaluate the alternatives to beach renourishment but will evaluate alternative sand sources to accomplish the renourishment of this section of Miami Beach.

2.1 DESCRIPTION OF ALTERNATIVES

2.1.1 PROPOSED BORROW AREAS SOUTH OF GOVERNMENT CUT

Three potential borrow areas south of Government Cut have been or are being developed for future renourishment of the Dade County BEC&HP Project. These borrow areas are located about 2 miles east of Key Biscayne in about 30 to 45 feet of water and are situated between two hardground/reef communities. The sites have been designated SGC-2 borrow area, SGC-EXT-1 borrow area, and SGC-EXT-2 borrow area. To protect reef communities each borrow area has been designed to have a buffer zone of at least 400 feet from any hardground area. The borrow areas have also been designed to avoid four potentially significant cultural resources identified in the vicinity. Sand from these areas is generally light gray, poorly graded carbonate sand with a trace of silt and gravel sized shell fragments. In the SGC-2 borrow area the silt content ranges from 1.3 to 10.3 percent with an average of 4.5 percent. The composite mean grain size is 0.56 mm. In the SGC-EXT-1 and SGC-EXT-2 borrow areas the silt content ranges from 0.8 to 9.2 percent with an average of 3.7 percent. The composite mean grain size is 0.62 mm. In all the borrow areas, rock fragments from 1 inch to 3 feet in diameter may make up to 5 percent of the material in the borrow area. The use of these borrow areas will require that all rock fragments larger than 1 inch be separated from the sand and disposed of in an approved area offshore. All three borrow areas represent high quality beach nourishment sand sources that contain a low amount of silt.

The SGC-2 and SGC-EXT-1 borrow areas have been identified and developed as the source of sand for the upcoming renourishment at Sunny Isles. This renourishment is expected to take place during the fall of 2000 and the spring/summer of 2001. There is sufficient material in these borrow areas to complete both the Sunny Isles renourishment and the proposed renourishment at Miami Beach. It is proposed to conduct both renourishments under the same contract utilizing the same borrow areas.

2.1.2 DEEP WATER SAND SOURCES

Technology may be available for dredging deep-water sand sources (60 to 300 feet deep). However we have no information on the cost, location, quantity, suitability, or environmental impacts associated with such dredging. It is unlikely that this information will be available for the proposed project.

2.1.3 DISTANT DOMESTIC SAND SOURCES

Non-local offshore sources of sand (sand located outside the immediate Dade County area) are discussed here as an alternative to the proposed borrow area. This sand could come from other areas within Florida or perhaps outside the state. According to investigations conducted during of the Coast of Florida Erosion and Storm Effects Study, Region III, a substantial amount of sand lies off the coast of Palm Beach County (estimated at 655,025,947 cubic yards). The renourishment needs of the Palm Beach County Shore Protection Project is estimated at 26,253,000 cubic yards of material over the next 50 years [except the Delray segment (28 years) and Boca Raton segment (43 years)]. Although the use of distant sources causes an increase to project costs, the inadequate supply of sand in Dade County will result in the use of alternate sources in the future. However, Palm Beach County has objected to the use of sediment deposits offshore of Palm Beach County for beach nourishment projects in Dade County. Refer to letter dated April 25, 1995, from the Director of the Department of Environmental Resources Management for Palm Beach County in Appendix C.

2.1.4 FOREIGN SAND SOURCES

Calcium carbonate sands are found extensively off the coast of the Bahamas and have been identified as a potential sand source for the Dade County project. These aragonite sand deposits contain only trace amounts of silt or clay sized material. The mean grain size ranges from 0.25 mm to 0.29 mm

and is moderately sorted. The specific gravity of oolitic aragonite ranges from 2.75 to 2.88, compared to 2.65 for quartz sand. Being denser, oolitic aragonite behaves hydraulically as larger sized quartz grains. Aragonite's higher specific gravity and well-rounded texture of the grains cause oolite sand to have a hydraulic equivalent mean grain size of 0.34 mm. Another potential sand source may exist around the Turks and Caicos Islands. This sand is similar in characteristics to the Bahamian sand. The Corps was in the process of evaluating these sands as a potential source for beach renourishment in Dade County. However, Congress in the Conference Report for the FY-1999 appropriations, stated that none of the funds added by Congress (in FY-1999) for the Dade County Beach Erosion Control and Hurricane Protection Project shall be used for the acquisition of foreign source materials for the project unless the Secretary of the Army provides written certification to the committees on Appropriation that domestic sources of material are not available. At this time the Corps has suspended evaluating aragonite and other foreign material as potential sources of sand.

2.1.5 UPLAND SAND SOURCE

Test results on native beach materials and sands available from commercial upland sand quarries indicate that, in most cases, the upland sand sources are texturally very compatible with little or no overfill required. Upland sand quarries are located on the Lake Wales Ridge of the Central Highlands physiographic region of south Florida. One upland source area is located southwest of Lake Okeechobee, at Ortona, Florida. There are presently two quarries at Ortona, and barge canal access to the Okeechobee Waterway is accessible to both quarries. The material from these two quarries consists of clean, medium to fine grained quartz sand that have a mean grain size range of 0.48 mm to 0.55 mm with generally less than 5 percent silt content. This alternative would involve the transporting sand from a quarry site, by either barge or railroad cars, to an appropriate offloading site near the project location. The sand would then be loaded onto dump trucks and then hauled to the beach and dumped at beach access points along the fill site. From these beach stockpiles, the material would be distributed along the beach by earthmoving equipment. Because of the potential to damage bridges, the dump trucks would most likely be limited to a maximum capacity of 12 cubic yards. With an estimated volume of 200,000 cubic yards of sand needed to complete the project, this would require over 16,000 truckloads. The use of larger dump trucks (i.e. 16 to 18 cubic yards), if allowed, would reduce the number of loads but would still be substantial. This would have a significant adverse impact on the traffic within the project area and areas adjacent to the project. There would also be an increase in the noise levels associated with trucking sand to the project site. In addition, vibrations caused by the trucks could damage structures that are located close to the roadways being used. The use of large numbers of trucks would also cause extensive damage to the roads used. This would require that the roads be repaired after construction has been completed

2.1.6 NO ACTION ALTERNATIVE (STATUS QUO)

If the no action alternative were implemented, the present condition of erosion along the Miami Beach shoreline in the vicinity of 63rd Street would continue at its present rate. The no action alternative does not provide the benefits needed to protect the coast from the effects of erosion and storm damage.

2.2 COMPARISON OF ALTERNATIVES

Table 1 lists the alternatives considered and summarizes the major features and consequences of the proposed action and alternatives. See section 4.0 Environmental Effects for a more detailed discussion of impacts of alternatives.

2.3 MITIGATION

Borrow area design will ensure sufficient buffer areas (presently planned at 400 feet) to minimize impacts from turbidity, sedimentation and mechanical damage on offshore hardground communities. Precision positioning of equipment, with a Geographic Positioning System (GPS), will aid in avoiding sensitive areas. The protection of potentially significant historical properties, located in the vicinity of the borrow areas will be accomplished by establishing adequate buffer areas around the identified anomalies. Mitigation for hardground impact due to the placement of the discharge pipeline would be performed as part of this proposed project. Mitigation would be accomplished by constructing an artificial reef with prefabricated reef modules, similar to what was conducted for the 1997 renourishment at Sunny Isles and Miami Beach and the 1999 renourishment at Surfside. A specific mitigation plan (Appendix H) has been developed in coordination with the Florida Department of Environmental Protection, Dade County Department of Environmental Resources Management and the U.S. Army Corps of Engineers. Section 5.0 Environmental Commitments, discusses other procedures that will be implemented to avoid or minimize potentially adverse environmental impacts.

Table 1: Summary of Direct and Indirect Impacts for Alternatives Considered.

ALTERNATIVE ENVIRONMENTAL FACTOR	PROPOSED BORROW AREAS SGC-2 & SGC-EXT-1	DEEP WATER SAND SOURCES	DISTANT DOMESTIC SAND SOURCES	UPLAND SAND SOURCES	NO ACTION
PROTECTED SPECIES	no impact on manatees , whales, or sea turtles expected from dredging borrow area; beach fill could impact sea turtle nesting or hatching.	impacts at borrow area not determined; additional site specific investigations needed; beach fill could impact sea turtle nesting or hatching.	no impact on manatees , whales, or sea turtles at borrow area expected; beach fill could impact sea turtle nesting or hatching	potential impact to sea turtle nesting and hatching; potential to effect scrub jay and gopher tortoise habitat.	continued erosion could affect sea turtle nesting habitat
HARDGROUND	potential sedimentation, turbidity and mechanical effects near borrow areas; impacts to hardgrounds from pipeline placement.	impacts from pipeline placement; investigations needed to determine potential impacts at borrow area.	potential sedimentation, turbidity and mechanical effects near borrow areas; impacts to hardgrounds from pipeline placement.	no impact if sand is truck hauled to beach; if transported by barge and pumped to beach, potential impact from pipeline placement.	no impact
EFFECTS ON ADJACENT SHORELINE EROSION	no effect expected	no effect	not determined; depends on site.	no effect	continued erosion of the project beach
FISH AND WILDLIFE RESOURCES	minor affect on benthic organisms at the beach and borrow areas – beach habitat improved	effects unknown, further investigation is needed.	minor affect on benthic organisms at the beach and borrow areas – beach habitat improved	depends on wildlife present at quarry - minimal impact is expected; beach habitat improved.	continued loss of beach habitat
VEGETATION	no seagrass beds present in borrow area; no impact.	no impacts expected	unknown at this time; could impact seagrasses if present in vicinity of borrow area.	no impact to seagrasses; upland vegetation may be affected - extent unknown.	continued erosion could impact dune vegetation
WATER QUALITY	temporary increase in turbidity and suspended sediments within borrow area and beach fill sites.	temporary increase in turbidity and suspended sediments within borrow area and beach fill sites.	temporary increase in turbidity and suspended sediments within borrow area and beach fill sites.	temporary increase in turbidity and suspended sediments at beach fill sites.	no impact
HISTORIC PROPERTIES	no impact expected	not determined	not determined	no impact expected	no impact

3 AFFECTED ENVIRONMENT

The Affected Environment section succinctly describes the existing environmental resources of the areas that would be affected if any of the alternatives were implemented. This section describes only those environmental resources that are relevant to the decision to be made. It does not describe the entire existing environment, but only those environmental resources that would affect or that would be affected by the alternatives if they were implemented. This section, in conjunction with the description of the "no-action" alternative forms the base line conditions for determining the environmental impacts of the proposed action and reasonable alternatives.

3.1 GENERAL ENVIRONMENTAL SETTING

The shoreline along this section of Miami Beach is lined with hotels, condominiums, and other commercial establishments. The area is used extensively for recreation.

3.2 VEGETATION

The dune system in Dade County between Government Cut and Bakers Haulover Inlet is largely artificial and was built as part of the Dade County BEC & HP Project. Dominant plant species in the dune communities include sea grapes, *Coccoloba uvifera*; the beach morning glory, *Ipomoea pes-caprea*; beach bean, *Canavalia rosea*; sea oats, *Uniola paniculata*; dune panic grass, *Panicum amarulum*; bay bean, *Canavalia maritima.* The beach berry or inkberry, *Scaevola plumieri;* sea lavender, *Mallotonia gnaphalodes*; spider lily, *Hymenocalis latifolia*; beach star, *Remirea maritima*; and coconut palm, *Coco nucifera* are also present. There is no appreciable dune system within Sunny Isles, due to extensive shoreline development.

Algal coverage on the offshore hardground areas fluctuates seasonally. The most common algal species observed within southeast Florida offshore hardground areas are *Caulerpa prolifera*, *Codium isthmocladum*, *Gracillaria* sp., *Udotea* sp., *Halimeda* sp., and various members of the crustose coralline algae of the family Corallinaceae. Algal growth is most luxuriant from late July through late October or early November. There seems to be a particular burst or bloom in the macroalgal population in conjunction with the seasonal upwelling that occurs in late July or early August (Smith, 1981, 1983; Florida Atlantic University and Continental Shelf Associates, Inc., 1994).

Seasonally, there is extensive macroalgal growth in the offshore soft bottom areas, with species of green algae (*Caulerpa* sp., *Halimeda* sp., and *Codium* sp.) being particularly abundant in the summer and the brown algal species (*Dictyota* sp. and *Sargassum* sp.) being more abundant in the winter (Courtenay *et al.*, 1974; Florida Atlantic University and Continental Shelf Associates, Inc., 1994). The sea grass *Halophila decipiens* has been observed offshore of Dade County, but is considered seasonal (April through November) in these offshore soft bottom areas.

3.3 THREATENED AND ENDANGERED SPECIES

3.3.1 SEA TURTLES

Sea turtles are present in the open ocean year-round offshore of Dade County because of warm water temperatures and hardbottom habitat used for both foraging and shelter. The predominant species is the loggerhead sea turtle, *Caretta caretta*, although green turtles, *Chelonia mydas*; leatherback turtles, *Dermochelys coriacea*; hawksbill turtles, *Eretmochelys imbricata*; and Kemp's ridleys, *Lepidochelys kempii* are also known to exist in the area. All the sea turtles except for the loggerhead are listed as endangered. The loggerhead is listed as threatened.

Loggerhead nesting in Dade County occurs from late April through September (Meylan et. al., 1995). The density of nesting along the Dade County shoreline north of Government Cut is relatively low. The loggerhead accounts for the majority of the nesting in the county with occasional nesting by green and leatherback turtles. Leatherback turtles may start nesting earlier than loggerheads. In Dade County the earliest nest documented by Meylan et. al., 1995, was on April 11, 1992. During the sea turtle nesting season, the Dade County Park and Recreation Department conducts daily surveys (commence on April 1) and relocates nests found along the beach from Sunny Isles south to Government Cut. This is done to prevent poaching or nest destruction due to beach maintenance, emergency vehicles which access the beach and other human related causes (Flynn 1992). All nests found during the surveys are relocated to a central hatchery on Miami Beach (pers. comm., B. Flynn, Dade Co. Dept. of Env. Res. Mgmt., 1993).

3.3.2 WEST INDIAN MANATEE

The estuarine waters around the inlets and bays within Dade County provide year-round habitat for the West Indian manatee, *Trichecus manatus*. Although manatees have been observed in the open ocean, they feed and reside mainly in the estuarine areas and around inlets. Significant foraging habitat is not known to exist in the areas around the project sites, nor have manatees been known to congregate in the nearshore environment within the project area.

3.3.3 OTHER THREATENED ENDANGERED SPECIES

Other threatened or endangered species that may be found in the in the coastal waters off of Dade County during certain times of the year are the finback whale, *Balaenoptera physalus*; humpback whale, *Megaptera novaeangliae*; right whale *Eubalaena glacialis*; sei whale, *Balaenoptera borealis*; and the sperm whale *Physeter macrocephalus catodon*. These are infrequent visitors to the area and are not likely to be impacted by project activities.

3.4 FISH AND WILDLIFE RESOURCES

3.4.1 BEACH AND OFFSHORE SAND BOTTOM COMMUNITIES

The beaches of southeast Florida are exposed beaches and receive the full impact of wind and wave action. Intertidal beaches usually have low species richness, but the species that can survive in this high-energy environment are abundant. The upper portion of the beach, or subterrestrial fringe, is dominated by various talitrid amphipods and the ghost crab *Ocypode quadrata*. In the midlittoral zone (beach face of the foreshore), polychaetes, isopods, and haustoriid amphipods become dominant forms. In the swash or surf zone, coquina clams of the genus *Donax* and the mole crab *Emerita talpoida* typically dominate the beach fauna. All these invertebrates are highly specialized for life in this type of environment (Spring, 1981; Nelson, 1985; and U.S. Fish and Wildlife Service [USFWS], 1997).

Shallow subtidal soft bottom habitats (0 to 1 meters [0 to 3 feet] depth) show an increasing species richness and are dominated by a relatively even mix of polychaetes (primarily spionids), gastropods (*Oliva* sp., *Terebra* sp.), portunid crabs (*Arenaeus* sp., *Callinectes* sp., *Ovalipes* sp.), and burrowing shrimp (*Callianassa* sp.). In slightly deeper water (1 to 3 meters [3 to 10 feet] depth) the fauna is dominated by polychaetes, haustoid and other amphipod groups, bivalves such as *Donax* sp. and *Tellina* sp. (Marsh *et al.*, 1980; Goldberg *et al.*, 1985; Gorzelany and Nelson, 1987; Nelson, 1985; Dodge *et al.*, 1991.

Offshore soft bottom communities are less subject to wave-related stress than are nearshore soft bottom communities. They exhibit a greater numerical dominance by polychaetes as well as an overall greater species richness than their nearshore counterparts. Barry A. Vittor & Associates, Inc. (1984) reported polychaetes made up 68.9 percent of the macrobenthic community off Port Everglades, followed by mollusca (13.2 percent), arthropods (10.7 percent), echinoderms (1.2 percent), and miscellaneous other groups (6.0 percent). Goldberg (1985) reported polychaetes as the dominant taxon from his infaunal survey off northern Broward County. Dodge *et al.* (1991) found polychaetes to be the most abundant group in 18 meters (60 feet) of water off Hollywood, Florida. In March 1989, polychaetes made up 51.7 percent of the macrofaunal community at that location followed by nematodes (14.3 percent), smaller species of crustaceans (9.0 percent), oligochaetes (4.3 percent), nemerteans (3.6 percent), and bivalves (2.9 percent).

Larger members of the invertebrate macrofauna seen occasionally in these offshore soft bottom areas between the second and third reef lines include the queen helmet, *Cassia madagascariensis*; the king helmet, *Cassia tuberosa*; Florida fighting conch, *Strombus alatus*; milk conch, *Strombus costatus*; Florida spiny jewel box, *Arcinella cornuta*; decussate bittersweet, *Glycymeris decussata*; calico clam, *Macrocallista maculata*; tellin, *Tellina* sp.; and cushion star, *Oreaster reticulatus*. Commercially valuable species, such as the Florida lobster, *Panulirus argus* move through this area as they migrate from offshore to nearshore areas (Courtenay *et al.*, 1974).

Surf zone fish communities are typically dominated by relatively few species (Modde and Ross, 1981; Peters and Nelson, 1987). Fish species that can be found in the surf zone include, Atlantic threadfin herring, *Opisthonema oglinum*; blue runner, *Caranx crysos*; spotfin mojarra, *Eucinostomus argenteus*; southern stingray, *Dasyatis americana*; greater barracuda, *Sphyraena barracuda*; yellow jack, *Caranx bartholomaei*; and the ocean triggerfish, *Canthidermis sufflamen*, none of which are of local commercial value. Most of the fish making up the inshore surf community tend to be either small species or juveniles (Modde, 1980).

Fish species specifically associated with the sand flats and soft bottom areas between the first and second reefs off Palm Beach, Broward, and Dade counties include lizardfish, *Synodus* sp.; sand tilefish, *Malacanthus plumieri*; yellow goatfish, *Mulloidichthys martinicus*; spotted goatfish, *Pseudupeneus maculatus*; jawfish, *Opistognathus* sp.; stargazer, *Platygillellus (Gillellus) rubrocinctus*; flounder, *Bothus* sp.; and various species of gobies and blennies, none of which have significant local commercial value.

3.4.2 REEF/HARDGROUND COMMUNITIES

The classic reef distribution pattern described for southeast Florida reefs north of Key Biscayne consists of an inner reef in approximately 15 to 25 feet (5 to 8 meters) of water, a middle patch reef zone in about 30 to 50 foot (9 to 15 meters) of water, and an outer reef in approximately 60 to 100 foot (18 to 30 meters) of water. This general description was first published by Duane and Meisburger (1969) and has been the basis for most descriptions of hardground areas north of Government Cut, Miami since that time (Goldberg, 1973; Courtenay *et al.*, 1974; Lighty *et al.*, 1978; Jaap, 1984). Development of these three reef terraces into their present form is thought to be related to fluctuations in sea level stands associated with the Holocene sea level

transgression that began about 10,000 years ago. An extensive sand zone lies between the middle and outer reef communities. It is in this sand area that the offshore borrow areas are located.

Lighty *et al.* (1978) showed that active barrier reef development took place as far north as the Fort Lauderdale area as late as 8,000 years ago. It is possible that the reefs and hardground areas seen from Delray Beach southward are the result of active coral reef growth in the relatively recent past, whereas the hard bottom features seen north of Palm Beach Inlet may represent the outcropping of older, weathered portions on the Anastasia Formation. The reefs north of Palm Beach Inlet (Lake Worth Inlet) do not show the same orientation to shore as those to the south and the classical "three reef" hardgrounds description begins to differ north of that inlet (Continental Shelf Associates, Inc., 1993a).

The composition of hardground biological assemblages along Florida's east coast has been detailed by Goldberg (1970, 1973), Marszalek and Taylor (1977), Raymond and Antonius (1977), Marszalek (1978), Continental Shelf Associates, Inc. (1984; 1985; 1987; 1993b), and Blair and Flynn (1989). Although there are a large variety of hard coral species growing on the reefs north of Government Cut, these corals are no longer actively producing the reef features seen there. The reef features seen north of Government Cut have been termed "gorgonid reefs" (Goldberg, 1970; Raymond and Antonius, 1977) because they support such an extensive and healthy assemblage of octocorals. Goldberg (1973) identified 39 species of octocorals from Palm Beach County waters. The U.S. Environmental Protection Agency (1992) lists 46 species of shallow water gorgonids as occurring along southeast Florida. Surveys by Continental Shelf Associates, Inc. (1984; 1985) identified 33 sponge, 21 octocoral, and 5 hard coral species on offshore reefs off Ocean Ridge and 40 sponge, 18 octocoral, and 14 hard coral species on the offshore reefs off Boca Raton. Blair and Flynn (1989) described the reefs and hard bottom communities off Dade County and compared them to the offshore reef communities from Broward and Palm Beach counties. They documented a decrease in the hard coral species density moving northward from Dade County to Palm Beach County. Despite this gradual decrease in the density of hard coral species present, the overall hardground assemblage of hard corals, soft corals, and sponges seen along southeast Florida's offshore reefs remains remarkably consistent throughout the counties of Dade, Broward, and Palm Beach. Commercially, the most important invertebrate species directly associated with these hardground areas is the Florida lobster, *Panulirus argus*.

Common fish species identified with the reef/hardground communities include grunts (Haemulidae), angelfish (Pomacanthidae), butterflyfish (Chaetodontidae), damselfish (Pomacentridae), wrasses (Labridae), drum (Sciaenidae), sea basses (Serranidae) snapper (Lutjanidae) and parrotfish (Scaridae). Important commercial and sport fish such as black margate (*Ansiotremus surinamensis*), gag (*Mycteroperca microlepis*), red grouper (*Epinephelus morio*), red snapper (*Lutjanus campechanus*), gray snapper (*L. griseus*) Hogfish (*Lachnolaimus maximus*) and snook (*Centropomus undecimalis*) are also associated with these reefs. The precise composition of the fish assemblage associated with any given location along these hardground areas is dependent upon the structural complexity of the reef at that location.

Herrema (1974) reported over 300 fish species as occurring off southeast Florida. Approximately 20 percent of these species were designated as "secondary" reef fish. Secondary reef fish are fish species that, although occurring on or near reefs, are equally likely to occur over open sand bottoms. Many of these species, such as the sharks, jacks, mullet, bluefish, sailfish, and marlin (none of which have significant local commercial value), are pelagic or open water species and are transient through all areas of their range.

3.5 ESSENTIAL FISH HABITAT

The Magnuson-Stevens Fishery Conservation and Management Act, 16USC 1801 et seq. Public Law 104-208 reflects the Secretary of Commerce and Fishery Management Council authority and responsibilities for the protection of essential fish habitat (EFH). Federal agencies that fund, permit, or carry out activities that may adversely impact EFH are required to consult with the National Marine Fisheries Service (NMFS) regarding the potential effects of their actions on EFH. In conformance with the 1996 amendment to the Act, the information provided in this EA will comprise the required EFH assessment and will be coordinated with NMFS.

The proposed project is within the jurisdiction of the South Atlantic Fishery Management Council (SAFMC) and is located in areas designated as EFH for coral, coral reef and live bottom habitat, red drum, shrimp, spiny lobster coastal migratory pelagic species and the snapper-grouper complex. In addition, the nearshore hardbottom habitat located in the vicinity of the proposed beach fill and the offshore hardbottom adjacent to the borrow areas are designated as Essential Fish Habitat-Habitat Areas of Special Concern (EFH-HAPC) for the snapper-grouper complex.

3.6 COASTAL BARRIER RESOURCES

There are no designated Coastal Barrier Resource Act Units located in the project area that would be affected by this project.

3.7 WATER QUALITY

Waters off the coast of Dade counties are classified as Class III waters by the State of Florida. Class III category waters are suitable for recreation and the propagation of fish and wildlife. Turbidity is the major limiting factor in coastal water quality in South Florida. Turbidity is measured in Nephelometric Turbidity Units (NTU), which quantitatively measure light-scattering characteristics of the water. However, this measurement does not address the characteristics of the suspended material that creates turbid conditions. According to Dompe and Haynes (1993), the two major sources of turbidity in coastal areas are very fine organic particulate matter and sediments and sand-sized sediments that become resuspended around the seabed from local waves and currents. Florida state guidelines set to minimize turbidity impacts from beach restoration activities confine turbidity values to under 29 NTU above ambient levels outside the turbidity mixing zone for Class III waters.

Turbidity values are generally lowest in the summer months and highest in the winter months, corresponding with winter storm events and the rainy season (Dompe and Haynes, 1993; Coastal Planning & Engineering [CPE], 1989). Moreover, higher turbidity levels can generally be expected around inlet areas, and especially in estuarine areas, where nutrient and entrained sediment levels are higher. Although some colloidal material will remain suspended in the water column upon disturbance, high turbidity episodes usually return to background conditions within several days to several weeks, depending on the duration of the perturbation (storm event or other) and on the amount of suspended fines.

3.8 HAZARDOUS, TOXIC AND RADIOACTIVE WASTE

The coastline within the project area is located adjacent to predominantly residential, commercial and recreational areas. The areas within the project are high-energy littoral zones and the material used for nourishment is composed of particles with large grain sizes that do not normally have contaminants adsorbing to them. The nature of the work involved with the renourishment of beaches is such that contamination by hazardous and toxic wastes is very unlikely. No contamination due to hazardous and toxic waste spills is known to be in the study area.

3.9 AIR QUALITY

Air quality within the project area is good due to the presence of either on or offshore breezes. Dade County is in attainment with the Florida State Air Quality Implementation Plan for all parameters except for the air pollutant ozone. The county is designated as a moderate non-attainment area for ozone.

3.10 NOISE

Ambient noise around the project area is typical to that experienced in recreational environments. Noise levels range from low to moderate based on the density of development and recreational usage. The major noise producing sources include breaking surf, beach and nearshore water activities, adjacent residential and commercial areas, and boat and vehicular traffic. These sources are expected to remain at their present noise levels.

3.11 AESTHETIC RESOURCES

The project area consists of light sandy beige beaches that contrast strikingly with the deep hues of the panoramic Atlantic Ocean. The eastern foreground consisting of dune vegetation is backdropped by condominium and hotel tropical landscape plantings in many areas. Coconut, sabal, and date palm trees provide vertical human scale transition between the structures and the beachfront. Beachfront plantings of sea oats, dune sunflower, seagrapes, morning glory vines and many other tropical beach plantings provide an aesthetic transition between the remaining dunes and the beach. The project segments consist of moderate to good aesthetic values with few exceptions throughout the entire project.

3.12 RECREATION RESOURCES

Dade County is a heavily populated county on Florida's Atlantic Coast, which receives a tremendous volume of tourists, particularly during the winter months. Those beaches that can be accessed by the general public are heavily used year round. Those beaches which are associated with condominiums, apartments and hotels have more restricted access for the general public, but receive use from the many visitors who frequent these facilities as well as those members of the general public who walk or jog along the beachfront.

Miami Beach has public access and receives heavy use by swimmers and sunbathers. Adjacent to these beaches are many condominiums and hotels used by long term and short term visitors and residents of the area. Other water related activities within the project area include on-shore and offshore fishing, snorkeling, SCUBA diving, windsurfing and recreational boating. Most of the boating activity in the area originates from either Bakers Haulover Inlet or Government Cut. Both offshore fishing and diving utilize the natural and artificial reefs located within and adjacent to the project area. Commercial enterprises along the beach rent beach chairs, cushions, umbrellas, and jet skis. Food vendors can also be found along the beach areas. The revenue generated by beachgoers supports a resurgent Miami Beach business district in the project vicinity.

3.13 HISTORIC PROPERTIES

Documented transportation activities along the southeastern coast of Florida date from the second half of the 16th century. As a consequence of over 400 years of navigation in the Bahama Channel, several hundred shipwrecks have been documented in the waters off the southeast coast of the state.

Remains of these and other unrecorded shipwrecks may be located in the vicinity of the proposed borrow areas.

Archival research and field investigations have been conducted for the study area and coordinated with the Florida State Historic Preservation Officer (SHPO). Results of the investigations for the SGC-2, SGC-EXT-1 and SGC-EXT-2 borrow areas are discussed in the reports, *A Submerged Cultural Resource Magnetometer Survey for Two Borrow Areas, Second Beach Renourishment, Dade County, Florida*, May 1993 and *A Magnetometer and Side Scan Survey, Borrow Area Extension, Dade County, Florida*, October 1996. Both reports were prepared by Tidewater Atlantic Research. Five magnetic anomalies were identified in the areas surveyed during the field investigations described in the above referenced reports. One target was confirmed to be the remains of a modern steel hull vessel sunk as an artificial reef. The other four targets are considered to be potentially significant as their signatures correspond with those of previously identified National Register eligible submerged cultural resources. No significant historic properties have been identified on the beach segment proposed for renourishment.

4 ENVIRONMENTAL EFFECTS

This section is the scientific and analytic basis for the comparisons of the alternatives. See table 1 in section 2.0 Alternatives, for summary of impacts. The following includes anticipated changes to the existing environment including direct, indirect, and cumulative effects.

4.1 GENERAL ENVIRONMENTAL EFFECTS

The placement of sand on the beach would restore some of the beach's ability to provide protection against storms and flooding. It would also enhance the appearance and suitability for recreation along the beach and would provide additional habitat for threatened an endangered species of sea turtles. Dredging in the proposed borrow area would cause a depletion of sand, however the area does not currently support seagrass, reefs, hard bottom, or other particularly productive habitat that would be altered within the borrow area. Although hardgrounds are located outside of the borrow area, a buffer zone will be used to minimize or eliminate possible impacts due to dredging. Placement of the discharge pipeline across the first reef would impact the associated benthic community including soft and hard corals. Any adverse impacts to the first reef would be appropriately mitigated. If no action is taken, the project beach would continue to erode and shoreline recession would continue.

4.2 VEGETATION

4.2.1 BEACH RENOURISHMENT ACTIVITIES

There are no sea grasses algal communities present in the footprint of the beach fill or the adjacent nearshore areas. No work would be performed on vegetated upland or dune areas. No adverse impacts to either marine or terrestrial vegetation are expected.

4.2.2 PROPOSED BORROW AREAS SOUTH OF GOVERNMENT CUT

There are no seagrass beds present in the proposed borrow areas. Depending on the season when dredging would occur, some ephemeral algal communities could be present in the borrow areas. Any algal communities present within the areas dredged would be affected. This impact would be short-term as the algal communities would be expected to regrow after dredging is completed.

4.2.3 DEEP WATER SAND SOURCES

No deep water offshore sources of sand have been identified or evaluated for this renourishment activity. Impacts associated with using deepwater sources cannot be predicted at this time. Information is not available concerning the suitability or environmental impacts associated with deep water dredging. It is unlikely that this information will be available for this proposed renourishment. It is possible that deep water sand sources may be identified at a later time for future nourishments of the Dade County Beach Erosion Control and Hurricane Protection Project. The assessment of impacts on vegetation would occur at that time.

4.2.4 DISTANT DOMESTIC SAND SOURCES

No distant offshore sources of sand have been identified or evaluated for this renourishment activity. Impacts associated with using distant offshore sources cannot be predicted at this time. It is possible that distant offshore sand sources may be identified in the future. The assessment of impacts on vegetation would occur at that time.

4.2.5 UPLAND SAND SOURCE

Sand from an upland source would be obtained from a commercial quarry. There would likely be some terrestrial vegetation loss at the quarry site in association with the excavation of sand.

4.2.6 NO ACTION ALTERNATIVE (STATUS QUO)

This alternative would have no effect on marine vegetation. However, continued erosion could eventually result in the loss upland and dune vegetation adjacent to the beach.

4.3 THREATENED AND ENDANGERED SPECIES

4.3.1 BEACH RENOURISHMENT ACTIVITIES

Beach nourishment and associated activities have the potential to impact sea turtles and may have the following effects. These potential effects would apply to any of the alternative sand sources discussed including the preferred borrow areas.

a. Scarp development leading to hindrance or blockage of accessibility to nesting habitat.

b. Adverse alteration of moisture levels or temperature in beach due to modified nesting material.

c. Compaction and cementation of beach sediments that cause reduced nesting success and aberrant nest cavity construction resulting in reduced nesting and/or hatching success.

d. If carried out during the nesting season, there is a potential for the destruction of nests that are not identified during the daily nest survey and relocation program.

e. Disruption of nesting activities that could lead to poor nest site selection and energetic cost diminishing egg production.